I CLAIM:

1. A chuck actuator comprising:

a hollow housing having a chamber extending along an axis and having a front end and a rear end;

a ring in the chamber forming with the front end thereof a front compartment;

a piston in the chamber between the ring and the rear end and forming an intermediate compartment with the ring and a rear compartment with the rear end;

an axially extending stem on the piston projecting forward through the ring and through the intermediate and front compartments, adapted to engage and open a chuck, and formed with a region of enlarged diameter, the piston being axially shiftable between a rear position with the enlarged-diameter region offset rearward from the ring and with the stem forming with the ring an axially extending passage between the front and intermediate compartments and a front position with the enlarged-diameter portion fitting snugly in the ring and substantially closing the passage; and

means including ports opening into the compartments for

pressurizing the rear compartment and

depressurizing the front and intermediate compartments for shifting th piston forward

at a speed slowing when the front position is reached and for

pressurizing the front compartment and intermediate compartments and depressurizing the rear compartment for shifting the position rearward into the rear position.

2. The chuck actuator defined in claim 1 wherein the stem is formed immediately forward of the enlarged-diameter region with a forwardly smoothly tapered region, whereby on forward shifting the piston slows smoothly as the tapered region enters the ring.

3. The chuck actuator defined in claim 1 wherein the ports include a vent port opening into the intermediate compartment.

4. The chuck actuator defined in claim 3 further comprising

means for varying the flow cross section of the vent port.

5. The chuck actuator defined in claim 4 wherein the means for varying includes a screw seated in the housing and having a tapered tip engaged in the vent port.

6. The chuck actuator defined in claim 1 wherein the housing and ring are both of two parts.

7. The chuck actuator defined in claim 1 wherein the housing is provided with a front and rear axial abutments spacedly flanking the ring and the ring is axially displaceable between the abutments, whereby the ring bears against the rear abutment when the front compartment is pressurized more than the intermediate compartment.

8. The chuck actuator defined in claim 7 wherein the ring is formed with a bypass passage that is blocked by the rear abutment when the ring bears thereon.

9. The chuck actuator defined in claim 8 wherein the bypass passage is formed by a plurality of angularly spaced notches cut in the ring.

10. The chuck actuator defined in claim 7 wherein the abutments are spaced such that the ring can only move through an axial stroke of between 0.1 mm and 1.5 mm.

11. The chuck actuator defined in claim 1 wherein the ring has a tubularly cylindrical collar coaxially surrounding the stem.